Name Key Date

291 Chapter 7.1-7.4 Review

State the degree and leading coefficient for the following polynomials.

1. $2x^2 - 6x^3 + 5x^4 - 8$ Degree 4 Leading coefficient 5

2. $7x^8 + 3x^3 - 2x$ Degree 8 Leading coefficient 7

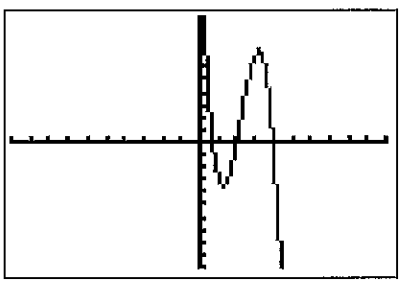
3. $4x^4 + 3x^5 - 2x^3 + 10$ Degree 5 Leading coefficient 3

For #s 4-6, answer the following questions:

a. Is the function odd or even? b. Describe the end behavior.

c. State the number of real zeros.

#4



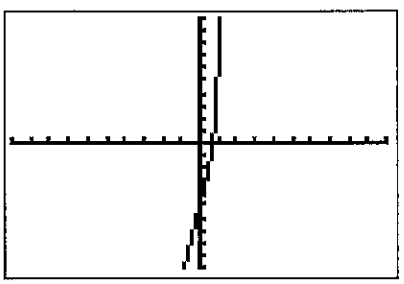
4. a. ODD

b. As $x \to +\infty$, then $f(x) \to -\infty$

As $x \to -\infty$, then $f(x) \to +\infty$

c. 3

#5



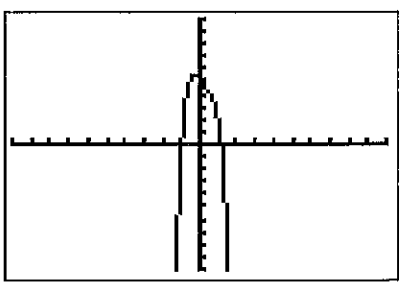
5. a. ODD

b. As $x \to +\infty$, then $f(x) \to +\infty$

As $x \to -\infty$, then $f(x) \to -\infty$

c. 1

#6



6. a. even

b. As $x \to +\infty$, then $f(x) \to -\infty$

As $x \to -\infty$, then $f(x) \to -\infty$

c. 2

Solve using quadratic techniques. (Do these on LL)

7. $x^5 - 64x = 0$ $\{0, \pm 2\sqrt{2}, \pm 2i\sqrt{2}\}$

$x(x^4 - 64)$

$x(x^2+8)(x^2-8) = 0$

$x = 0 \quad x = \pm 2i\sqrt{2} \quad x = \pm 2\sqrt{2}$

8. $x^3 + x^2 + 12x + 12 = 0$ $\{-1, \pm 2i\sqrt{3}\}$

$x^2(x+1) + 12(x+1)$

$(x^2+12)(x+1) = 0$

$x^2 = -12 \quad x = -1$

$x = \pm 2i\sqrt{3}$

9. $x^4 - 13x^2 + 40 = 0$

Let $u = x^2$ $u^2 - 13u + 40$

$(u-8)(u-5) = 0$

$u = 8 \quad u = 5$

$x^2 = 8 \quad x^2 = 5$

$x = \pm 2\sqrt{2} \quad x = \pm\sqrt{5}$ $\{\pm 2\sqrt{2}, \pm\sqrt{5}\}$

10. $x^{\frac{2}{3}} + 14x^{\frac{1}{3}} + 24 = 0$ Let $u = x^{\frac{1}{3}}$

$u^2 + 14u + 24 = 0$

$(u+12)(u+2) = 0$

$u = -12 \quad u = -2$

$(x^{\frac{1}{3}} = -12)^3 \quad x^{\frac{1}{3}} = -2$

$x = -1728 \quad x = -8$ $\{-1728, -8\}$

Check

$(-1728)^{\frac{2}{3}}$

$144 - 168 + 24$

$4 + 14(-8)^{\frac{1}{3}}$

$4 - 28 + 24$

11. $x^3 - 64 = 0$ $\{4, -2 \pm 2i\sqrt{3}\}$

$(x-4)(x^2+4x+16) = 0$

$x = 4 \quad \frac{-4 \pm \sqrt{16 - 4(1)(16)}}{2}$

$\frac{-4 \pm 4i\sqrt{3}}{2}$

Graph the following function on your calculator. If they exist, calculate the real zeros, relative maximum and relative minimum. (Round to three decimal places)

Note: You may need to adjust your window or zoom to see the full graph

12. $f(x) = 3x^3 + 4x^2 - 2x - 4$

Zeros -1.929, 1.192 Max -.952, -4.216 Min

13. $f(x) = -2x^4 + 3x^2 - x + 1$

Zeros -1.144, 1.196 Max .029, 1.306 Min .915

14. Find k such that…

(x-2) is a factor of $f(x) = 3x^4 - 6x^3 + x^2 - 3x + k$.

2 | 3 -6 1 -3 k

6 0 2 -2

3 0 1 -1 ; k-2

$k - 2 = 0$

$k = 2$

15. Find k such that….

(x + 3) has a remainder of 5

$f(x) = -4x^3 - 6x^2 - 3x + k$

$63 + k = 5$

$-58 = k$

-3 | -4 -6 -3 k

12 -18 63

-4 6 -21 | 63+k

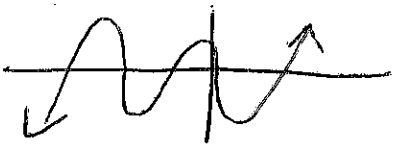
16. Use synthetic substitution to find P(2). $P(x) = 4x^5 - 3x^3 + 2x - 3$.

2 | 4 0 -3 0 2 -3

8 16 26 52 108

4 8 13 26 54 105

17. Sketch an odd function with a positive leading coefficient and a degree of 5. (Sketch the max number of turning points.)



18. Sketch an even function with a negative leading coefficient and a degree of 6. (Sketch the max number of turning points.)